CLAIMS

I/We claim:

1. A system for transmitting large data files of at least an aggregated 100 gigabytes from a source terminal to a geographically distant destination terminal in substantially non-real-time, the system comprising:

at least one satellite in a non-geostationary orbit, wherein the satellite is configured to store and forward data files and includes:

a wireless transceiver,

mass data storage, and

at least one processor coupled among the wireless transceiver and the mass data storage; and

at least first and second terrestrial or sea-based stations,

wherein the first station has at least a wireless transmitter and is configured to

receive a large data file from the source terminal, wherein the large data file represents an aggregate of least 100 gigabytes,

process the large data file for transmission by at least encoding the large data file with block coding and forward error correction, and

transmit the large data file to the satellite at a predetermined time, wherein the large data file includes an electronic address for the destination terminal;

wherein the second station has at least a wireless receiver and is configured to

receive the large data file from the satellite and

transfer the large data file to the destination terminal based in part on the electronic address for the destination terminal;

wherein the satellite stores the large data file for more than several minutes before transmitting it to the second station;

wherein at least the first station or satellite are further configured to monitor a signal quality from a beacon channel for an indication that a wireless channel with the satellite is of acceptable quality before the large data file is transmitted over the wireless channel, or configured to monitor the signal quality from the beacon channel and suspend transmissions, adjusting power or adjusting a bandwidth for communications over the wireless channel based on the monitored signal quality; and

wherein the first and second stations further each include transceivers for communicating over a low bandwidth communication channel, wherein the low bandwidth communication channel is of a much lower bandwidth than the wireless channel, and wherein the second station is further configured to

detect blocks of data in the received large data file that contain uncorrectable errors and

request the first station to retransmit, over the low bandwidth communication channel, any data blocks from the large data file that contain errors, whereby the system provides a bit error rate (BER) on an order of at least 10^{-15} .

2. The system of claim 1 further comprising multiple satellites in low earth orbit, wherein the wireless channel is approximately in the Ka band to provide very high bandwidth, wherein each of the multiple satellites operate independent of each other, and

wherein at least the first station is configured to monitor a quality of the wireless channel and adjust the encoding of the large data file in response thereto;

wherein the low bandwidth channel is an alternate link between the first and second stations; and

wherein the second station requests at least the satellite to retransmit the large data file if the second station detects significant loss of data blocks in the large data file.

3. The system of claim 1 wherein the first station is on a vessel or vehicle, and wherein the satellite and the first station are configured to:

employ closed loop tracking between the satellite and the first station, via the beacon channel, to control pointing of at least the satellite or the first station.

4. In a system for providing communication services between geographically dispersed source and destination terminals, an apparatus comprising:

at least one airborne or spaceborne and movable wireless communications device, wherein the wireless communications device is configured to store and forward large data files of at least an aggregated 10 gigabytes, and includes:

a wireless transceiver for communicating with the source and destination terminals over at least one high bandwidth channel,

mass data storage configured to store the large data files for a predetermined period of time, wherein the predetermined period of time is greater than two minutes, and

at least one processor coupled among the wireless transceiver and the mass data storage;

wherein the processor, via the wireless transceiver, is configured to

control receipt of at least one large data file, from the source terminal, for storage in the mass data storage, and

after the airborne or spacebourne wireless communications device travels near to the destination terminal, control transmit of the large data file to the destination terminal.

5. The apparatus of claim 4 wherein the wireless communications device is a satellite, and the communication system employs a constellation of multiple orbiting satellites.

6. The apparatus of claim 4 wherein the wireless communications device is a satellite in a non-geostationary orbit.

7. The apparatus of claim 4 wherein the wireless transceiver employs radio frequency (RF) or optical communication techniques.

8. The apparatus of claim 4, further comprising a low bandwidth transceiver coupled with the processor for communicating over a low bandwidth channel, and wherein the processor is further configured to:

receive scheduling commands from a land- or sea-based mission control facility over the low bandwidth channel; and

schedule at least transmission of the large data files based on the scheduling commands.

9. The apparatus of claim 4 wherein the high bandwidth channel includes one or more channels that in aggregate have at least a 200 Mb/s bandwidth.

10. The apparatus of claim 4 wherein the processor is further configured to transmit the large data file to, or receive the large data file from, another airborne or spaceborne and movable wireless communications device.

11. The apparatus of claim 4 wherein the processor is further configured to:

autonomously receive a request to accept a new large data file from a new terminal, and

receive the new large data file if the processor autonomously determines that the new large data file may be stored in the mass data storage and be safely transmitted to another terminal.

12. The apparatus of claim 4 wherein the processor is configured to facilitate processing of the large data file via transparent relay mode communication.

13. The apparatus of claim 4 wherein the wireless transceiver operates via optical or radio frequency transmissions.

14. A computer-readable medium whose contents cause at least one land- or sea-based communications terminal to perform a method to process data for wireless transmission to at least one satellite in a non-geostationary orbit, wherein the satellite is configured to store and forward data packages to another terminal, the method comprising:

at the communications terminal, receiving a large data file of at least 10 gigabytes;

at the communications terminal, dividing the large data file into multiple smaller groups of data;

at the communications terminal, coding the large data file for error correction after transmission of the large data file;

determining whether a quality of a wireless, high bandwidth communications channel with the satellite is acceptable;

at the communications terminal, transmitting the divided and coded large data file to the satellite when the quality of the wireless, high bandwidth communications channel is acceptable; and

providing information to the satellite regarding the destination terminal, wherein the satellite stores the divided and coded large data file until the satellite is within sight of the destination terminal for transmission thereto.

15. The computer-readable medium of claim 14 wherein the computer-readable medium is a memory of the telecommunications server.

16. The computer-readable medium of claim 14 wherein the computer-readable medium is a logical node in a computer network receiving the contents.

17. The computer-readable medium of claim 14 wherein the computer-readable medium is a computer-readable disk.

18. The computer-readable medium of claim 14 wherein the computer-readable medium is a data transmission medium carrying a generated data signal containing the contents.

19. The computer-readable medium of claim 14 wherein the computer-readable medium is a removable memory.

20. The computer-readable medium of claim 14 wherein the method further comprises:

detecting groups of data in the large data file that contain uncorrectable errors, and

requesting retransmission, over a low bandwidth communication channel, any data groups from the large data file that contain errors.

21. The computer-readable medium of claim 14 wherein the method further comprises:

monitoring a quality of the wireless, high bandwidth communications channel and

adjusting the dividing or coding of the large data file in response thereto.

22. The computer-readable medium of claim 14 wherein the method further comprises:

detecting significant loss of data groups in the large data file, and

requesting retransmission of all or a significant part of the large data file.

23. The computer-readable medium of claim 14, further comprising inserting fill blocks instead of groups of the data when the high bandwidth communications channel is unacceptable .

24. The computer-readable medium of claim 14 wherein dividing the large data file includes block coding the large data file.

25. The computer-readable medium of claim 14 wherein coding the large data file includes forward error correcting the large data file.

26. The computer-readable medium of claim 14 wherein receiving the large data file includes receiving the large data file form a terminal located on a vehicle or vessel.

27. The computer-readable medium of claim 14 wherein coding the large data file includes encrypting the large data file form a terminal located on a vehicle or vessel.

28. The computer-readable medium of claim 14, further comprising a satellite phone link or another satellite link to transmit a small number of data packets to the another terminal to replace at least one group of data having errors.

29. In a communications system employing at least one satellite in a non-geostationary orbit configured to store large data files from a source terminal, and

forward the data files to a geographically distant destination terminal, a method for controlling wireless telecommunications in the system comprising:

monitoring a beacon channel between the satellite and at least the source or destination terminals, wherein the beacon channel provides an indication of a quality of at least one high bandwidth wireless channel between the satellite and the source or destination terminals;

determining a quality of the high bandwidth wireless channel based on the monitoring of the beacon channel; and

postponing transmission of all or portions of a large data file over the high bandwidth wireless channel if the determined channel quality is unacceptable, or adjusting a bandwidth for communications over the high bandwidth wireless channel based on the determined channel quality.

30. The method of claim 29, further employing the beacon channel to control power of transmissions from the satellite.

31. The method of claim 29, further employing the beacon channel to control pointing of the satellite with respect to either the source or destination terminal.

32. In a wireless communications system, an apparatus for controlling data transmissions with respect to at least one non-geostationary orbiting satellite, wherein the satellite is configured to store and forward data packages between land- or sea-based terminals, the apparatus comprising:

means for monitoring a beacon channel, wherein the beacon channel provides an indication of a quality of at least one high bandwidth wireless channel between the satellite and a land- or sea-based terminal;

means for signaling the satellite, based on the monitored channel quality, to transmit a large data package over the high bandwidth wireless channel if the channel quality is acceptable postpone transmission of a large

data package over the high bandwidth wireless channel if the channel quality is unacceptable, or

adjust a transmit power, or adjust a bandwidth for communications over the high bandwidth wireless channel if the channel quality is between acceptable and unacceptable; and

means for communicating under at least a simplex transmission scheme over the high bandwidth channel with the satellite.

33. The apparatus of claim 32, further comprising:

satellite ephemeris means for determining a location of the satellite;

terminal location means for determining global positioning location and land- or sea-based antenna orientation; and

means for coordinating data transmission or reception from the satellite based on the satellite ephemeris means and the terminal location means.

34. The apparatus of claim 32 wherein the means for communicating includes means for communicating under a duplex or half-duplex transmission scheme over the high bandwidth channel with the satellite.

35. The apparatus of claim 32 wherein the means for communicating includes means for providing an electronic address of a destination associated with the large data package, wherein the electronic address is a set of latitude and longitude coordinates, an account or identification number, or a universal resource locator (URL).

36. The apparatus of claim 32, further comprising:

antenna means;

satellite tracking means for determining a location of the satellite; and

antenna pointing means for generating antenna pointing instructions for directing the antenna means toward the satellite, wherein the antenna pointing instructions provide mechanical or phased array pointing instructions.

37. The apparatus of claim 32, further comprising:

satellite tracking means for determining a location of the satellite; and

antenna pointing means for generating antenna pointing instructions for the satellite, wherein the antenna pointing instructions provide gimbaled antenna or whole satellite body moving instructions to the satellite.

38. The apparatus of claim 32, further comprising:

beacon tracking means for automatically tracking the beacon channel.

39. The apparatus of claim 32, further comprising:

relay means for receiving the large data package from the satellite and forwarding the large data package via terrestrial links to a desired destination.

40. The apparatus of claim 32, further comprising:

means for instructing the satellite to not transmit the large data package when a transmit path from the satellite intersects a vector that potentially could interfere with transmissions.